Matrox® **Mura™ MPX Series**

System Builder's Guide

20149-101-0455
2015.05.21

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Graphics for Professionals

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Product overview

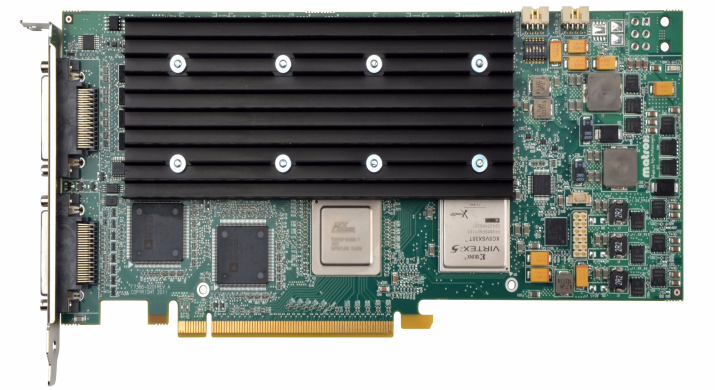
Matrox Mura MPX Series products combine input and output cards onto a single-slot PCIe® ×16 2.0 card. MPX Series products feature universal input channel support for both digital and analog video (HD, DVI, RGB/VGA®, SDI, Component, S-video, and Composite). MPX video capture cards work with output/input boards to provide additional analog video inputs.

Hardware summary

The Matrox Mura MPX Series family of products include the following key features:

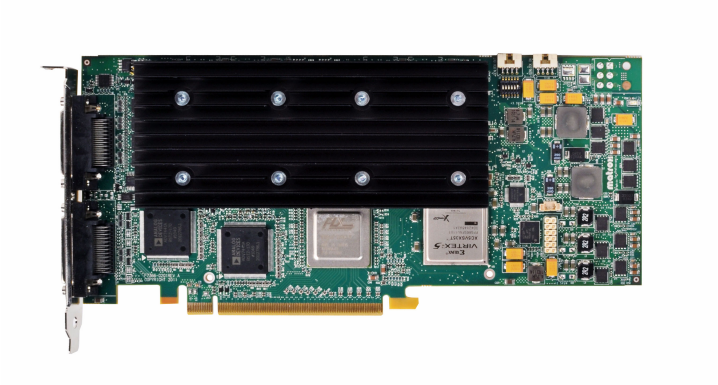
- Maximum output resolution of 2048 × 1152 (DVI) and 2048 × 1536 (RGB/VGA) per display.
- Maximum input resolution of 2560 × 1600 @ 30 Hz (DVI), 2048 × 1536 @ 47 Hz (RGB/VGA), and 1920 × 1080 (Component) per input.
- Designed for control rooms, operation centers and other mission critical environments, as well as digital signage and presentation systems.
- Facilitates video switching, signal conversion, scaling, compositing, and de-interlacing from a single card.

Mura MPX-4/4



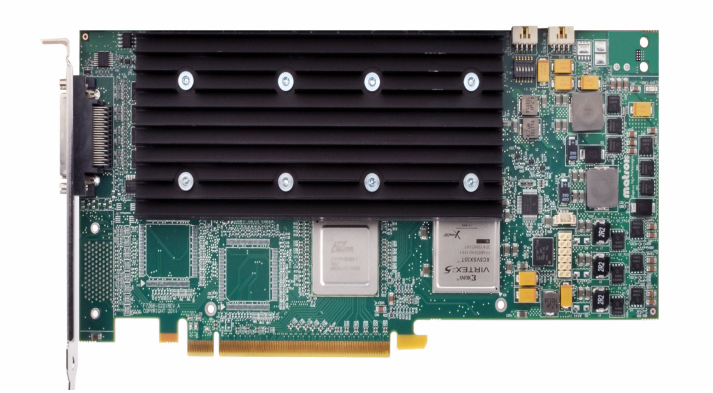
	Mura MPX-4/4
Part number	MURA-MPX44HF
Card type	PCIe ×16 2.0
Form factor	ATX
Connector	2× KX20
Memory	2 GB DDR2
Output support	4
Input support	4
Power consumption	Typical: 37W @ 12V, 0.5W @ 3.3V or 37.5W Total Worst Case: 43W @ 12V, 0.5W @ 3.3V or 43.5W Total
Weight	298 g
Dimensions	L: 9.50" / W: 0.75" / H: 4.407" L: 24.13 cm / W: 1.91 cm / H: 11.2 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Mura MPX-4/2



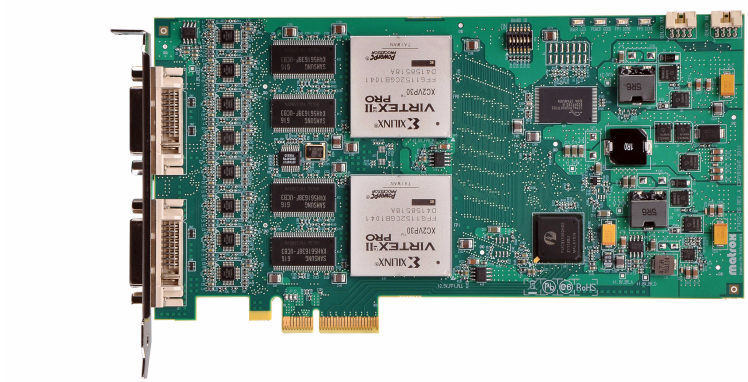
	Mura MPX-4/2
Part number	MURA-MPX42HF
Card type	PCIe ×16 2.0
Form factor	ATX
Connectors	2× KX20
Memory	2 GB DDR2
Output support	4
Input support	2
Power consumption	Typical: 37W @ 12V, 0.5W @ 3.3V or 37.5W Total Worst Case: 43W @ 12V, 0.5W @ 3.3V or 43.5W Total
Weight	294 g
Dimensions	L: 9.50" / W: 0.75" / H: 4.407" L: 24.13 cm / W: 1.91 cm / H: 11.2 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Mura MPX-4/0



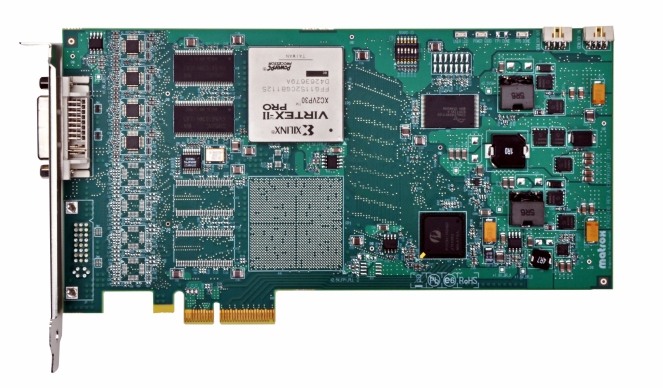
	Mura MPX-4/0
Part number	MURA-MPX40HF
Card type	PCIe ×16 2.0
Form factor	ATX
Connector	1× KX20
Memory	2 GB DDR2
Output support	4
Input support	0
Power consumption	Typical: 36W @ 12V, 0.5W @ 3.3V or 36.5W Total Worst Case: 41W @ 12V, 0.5W @ 3.3V or 41.5W Total
Weight	290 g
Dimensions	L: 9.50" / W: 0.75" / H: 4.407" L: 24.13 cm / W: 1.91 cm / H: 11.2 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Mura MPX-V16



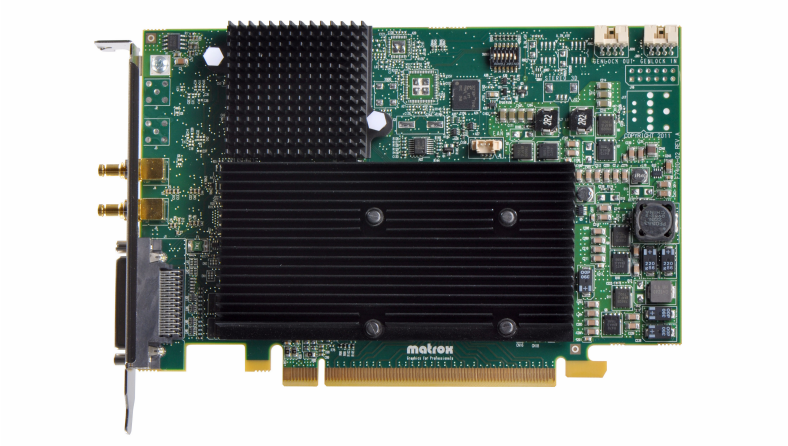
	Mura MPX-V16
Part number	MURA-MPXV16F
Card type	PCIe ×4 1.0
Form factor	ATX
Connectors	2× DVI-I
Memory	256 MB DDR SDRAM
Output support	—
Input support	16 inputs
Power consumption	Maximum: 17W @ 12V
Weight	184 g
Dimensions	L: 8.10" / W: 0.75" / H: 4.376" L: 20.6 cm / W: 1.91 cm / H: 11.1 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Mura MPX-V8



	Mura MPX-V8
Part number	MURA-MPXV8F
Card type	PCIe ×4 1.0
Form factor	ATX
Connector	1× DVI-I
Memory	128 MB DDR SDRAM
Output support	—
Input support	8 inputs
Power consumption	Maximum: 10W @ 12V
Weight	158 g
Dimensions	L: 8.10" / W: 0.75" / H: 4.376" L: 20.6 cm / W: 1.91 cm / H: 11.1 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Mura MPX-SDI



	Mura MPX-SDI
Part number	MURA-MPXSDIF
Card type	PCIe ×16 1.0
Form factor	ATX
Connectors	1× KX20, 2× DIN 1.0/2.3
Memory	1 GB DDR2
Output support	2
Input support	2
Power consumption	Typical: 20W @ 12V, 0.03W @ 3.3V or 20.03W Total
Weight	236 g
Dimensions	L: 6.60" / W: 0.75" / H: 4.407" L: 16.80 cm / W: 1.91 cm / H: 11.2 cm
Certifications	Class A: FCC, CE, ACMA, VCCI, ICES, CSA, KCC

Why choose a validated platform?

Matrox Mura MPX Series products are designed for control rooms, operation centers, and other mission critical environments that require stable, reliable, and durable solutions. Mura MPX Series products work in numerous non-validated, COTS motherboards and systems, but only a select few of these off-the-shelf solutions can be thoroughly tested, verified, and validated by Matrox. Choosing a validated platform guarantees a high-quality solution to drive your Mura MPX-based system.

Some of the key benefits of using a Matrox-validated platform include:

- **Optimized Performance** – Carefully selected by Matrox to ensure better performance, a validated platform guarantees that your Mura MPX product will work at or close to optimum performance.
- **Extensive Validation Process** – Systems are put to the test by Matrox Engineering, QA, Sales, and Marketing departments. From development and testing to sales and product demos, our employees use these systems in various practices to monitor performance. Using a validated platform guarantees the same level of performance experienced by Matrox staff.
- **Easier Deployment** – Using an already validated system takes the guesswork out of building a Mura MPX-based system. Integrators can use a validated platform to quickly and easily deploy solutions across a wide range of project sizes.
- **Faster Customer Support** – Customer support is faster, easier, and more precise because our technical support team is already familiar with the validated system you're using.
- **Uncompromised Compatibility** – Using a validated platform ensures that your Mura MPX product has been thoroughly tested and verified for uncompromised compatibility.
- **Improved Reliability** – Systems validated by Matrox have guaranteed thermal and ventilation characteristics, resulting in better product longevity.

Matrox is constantly reviewing new systems and looking to validate new platforms across multiple price points. Any system suggestions are welcome.

Validated platforms

The following platforms have been validated by Matrox to work with Matrox MPX Series products. For more information, see one of the following:

- "Validated systems", page 11
- "Validated motherboards", page 34
- "Validated chassis", page 53

Note: For improved performance, we recommend you avoid using PCIe® ×4 slots or lower.

Note: If graphics hardware is built into the motherboard of your system, you need to disable it in Windows® Device Manager. For more information, see your system manual or Windows help.

Validated systems

The following systems have been validated:

- "Advantech (AVS-240)", page 13
- "Advantech (AVS-290)", page 13
- "Advantech (AVS-540)", page 14
- "Advantech (AVS-541)", page 14
- "Advantech (AVS-840)", page 15
- "Advantech (AVS-860)", page 15
- "Blue Chip Ultima Mura i7", page 16
- "Blue Chip Ultima 2M", page 16
- "Blue Chip Ultima 5M", page 17
- "Dell® Precision™ Tower 5810 Workstation", page 17
- "Dell® Precision™ Workstation T3600", page 18
- "Dell® Precision™ Workstation T3610", page 19
- "Delo Step-PC Professional VS-Series X79", page 19
- "Delo Step-PC Professional VS-Series Z77", page 20

- "HP® Z420 Workstation", page 20
- "HP® Z440 Workstation", page 21
- "HP® Z600 Workstation", page 22
- "HP® Z620 Workstation", page 22
- "InoNet Magnius-II", page 22
- "Nijkerk (System MURA V1)", page 23
- "Portwell® M9020B", page 24
- "Pyramid Multiplex R-19 Mura System", page 24
- "Pyramid Multiplex S Mura System", page 25
- "Seneca PrysmHD Plus", page 25
- "Seneca VWC-4", page 26
- "Synnex Canada Touch Mura X79", page 26
- "Synnex Canada Touch Mura Z77", page 27
- "Trenton TVC2404", page 28
- "Trenton TVC3400", page 28
- "Trenton TVC4400", page 29
- "Trenton TVC4403", page 29
- "Trenton TVC4406", page 30
- "Trenton TVC4502", page 31
- "Trenton TVC5401", page 31
- "Trenton TVC5402", page 32

Advantech (AVS-240)

Supported Mura cards	3 (2 Mura MPX-4/4 and 1 Mura MPX-V16/MPX-V8)
Motherboard	Advantech ASMB-820
Chipset	Intel® C602J
Processor	Intel® Xeon® E5-2420 processor
System BIOS version	1.1
System memory	8 GB DDR3
Power supply	80 PLUS 500W PSU
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical, ×16 and ×8 electrical) ▪ 1 PCIe ×4 2.0 slot (×4 mechanical, ×4 electrical) ▪ 1 PCIe ×1 2.0 slot (×1 mechanical, ×1 electrical)
Expansion slot configuration	▪ If you're installing up to 2 Mura MPX-4/4 cards, insert the first Mura card in the blue slot labeled **PCIE6**. Insert the second Mura card in the blue slot labeled **PCIE4**. ▪ If you're installing 1 Mura MPX-V16//MPX-V8 card, insert the Mura card in the slot labeled **PCIE3**.
Possible maximum configuration	2 Mura MPX-4/4 cards + 1 Mura MPX-V16/MPX-V8 card

Advantech (AVS-290)

Supported Mura cards	2 (supports intercard transfers)
Motherboard	Advantech ASMB-781G4-00A1E
Chipset	Intel® C206
Processor	Intel® Xeon® E3-1200 processor
System BIOS version	1.1
System memory	8 GB DDR3
Power supply	400W
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot
Expansion slot configuration	▪ Insert the first Mura card in the blue slot labeled **PCIE6**. ▪ Insert the second Mura card in the blue slot labeled **PCIE4**.

Advantech (AVS-540)

Supported Mura cards	6 (5 Mura MPX-4/4 and 1 Mura MPX-V16/MPX-V8)
Motherboard	ASMB-822I
Chipset	Intel C602J
Processor	Intel® Xeon® E5-2600 Series
System BIOS version	V1.10
System memory	4 GB DDR3 1333 MHz, up to 96 GB DDR3 1600 MHz
Power supply	700W 80 plus single power supply
Chassis	4U
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical, ×8/×16 electrical) ▪ 3 PCIe ×16 3.0 slots (×16 mechanical, ×8 electrical) ▪ 1 PCIe ×8 slot (×8 mechanical, ×4 electrical)
Expansion slot configuration	▪ Insert the first two Mura MPX-4/4 cards in the slots labeled **PCIEx16_SLOT4** and **PCIEx16_SLOT 6**. ▪ Insert the next three Mura MPX-4/4 cards in the slots labeled **PCIEx16_SLOT 2**, **PCIEx16_SLOT 3,** and **PCIEx16_SLOT 5.** ▪ Insert one Mura MPX-V16/MPX-V8 card inthe slot labeled **PCIEx8_SLOT 7**.

Advantech (AVS-541)

Supported Mura cards	15 (5 Mura MPX-4/4 and 10 Mura MPX-V16/MPX-V8)
Motherboard	PCE-7127 (SHB), PCE-7B17-00A1E (Backplane)
Chipset	Intel® C216
Processor	Intel® Xeon® E3-1275 V2 processor, 3.50 GHz
System BIOS version	V1.10
System memory	4 GB DDR3, 1333 MHz
Power supply	810W redundant
Chassis	4U
Available PCIe expansion slots	▪ 5 PCIe ×16 3.0 slots (×16 mechanical, ×8 electrical) ▪ 6 PCIe ×16 3.0 slots (×16 mechanical, ×4 electrical) ▪ 3 PCIe ×4 3.0 slots ▪ 1 PCIe ×4 2.0 slots
Expansion slot configuration	▪ Insert the Mura MPX-4/4 cards in the slots labeled **P1PCIEX8_1**, **P1PCIEX8_2**, **P1PCIEX8_3**, **P2PCIEX8_1**, and **P2PCIEX8_2**. ▪ Insert the Mura MPX-V16/MPX-V8 cards in the slots labeled **PPCIEX4_1**, **P1PCIEX4_3**, **P1PCIEX4_4**, **P1PCIEX4_5**, **P1PCIEX4_6**, **P2PCIEX4_1**, **P2PCIEX4_2**, **P2PCIEX4_3**, **P2PCIEX4_4**, and **P2PCIEX4_5**.

Advantech (AVS-840)

Supported Mura cards	10
Motherboard	PCE-7127 (SHB), PCE-5B12-00A1 (Backplane)
Chipset	Intel® C216
Processor	Intel® Xeon® E3-1275 V2 processor, 3.50 GHz
System BIOS version	Core version: 4.6.5.3 0.18 x64 Project version: PCE 7127X002
System memory	4 GB DDR3, 1333 MHz
Power supply	810W redundant
Chassis	IPC-623 4U rack mount
Available PCIe expansion slots	▪ 10 PCIe ×16 2.0 slots (×16 mechanical, ×16 electrical) ▪ 1 PCIe ×16 2.0 slots (×16 mechanical, ×4 electrical)
Expansion slot configuration	Insert the Mura MPX-4/4 cards in the slots labeled **P1PCIEX16_1**, **P1PCIEX16_2**, **P1PCIEX16_3**, **P1PCIEX16_4**, **P1PCIEX16_5**, **P2PCIEX16_1**, **P2PCIEX16_2**, **P2PCIEX16_3**, **P2PCIEX16_4**, and **P2PCIEX16_5**.

Advantech (AVS-860)

Supported Mura cards	10
Motherboard	PCE-7127 (SHB), PCE-PCE-5B12-00A1 (Backplane)
Chipset	Intel® C216
Processor	Intel® Xeon® E3-1275 V2 processor, 3.50 GHz
System BIOS version	Core version: 4.6.5.3 0.18 x64 Project version: PCE 7127X002
System memory	4 GB DDR3, 1333 MHz
Power supply	800W redundant
Chassis	IPC-622 6U rack mount
Available PCIe expansion slots	▪ 10 PCIe ×16 2.0 slots (×16 mechanical, ×16 electrical) ▪ 1 PCIe ×16 2.0 slots (×16 mechanical, ×4 electrical)
Expansion slot configuration	Insert the Mura MPX-4/4 cards in the slots labeled **P1PCIEX16_1**, **P1PCIEX16_2**, **P1PCIEX16_3**, **P1PCIEX16_4**, **P1PCIEX16_5**, **P2PCIEX16_1**, **P2PCIEX16_2**, **P2PCIEX16_3**, **P2PCIEX16_4**, and **P2PCIEX16_5**.

Blue Chip Ultima Mura i7

Supported Mura cards	7
Motherboard	ASUS® P6T7 WS
Chipset	Intel® Q77 PCH
Processor	Intel® i5-3450 processor, 3.10 GHz
System BIOS version	1001
System memory	3 GB DDR3
Power supply	750W
Available PCIe expansion slots	▪ Slots 1, 3, and 5 – PCIe ×16 2.0 at ×16 or ×8 mode ▪ Slot 7 – PCIe ×16 2.0 at ×16 mode ▪ Slots 2, 4, and 6 – PCIe ×16 2.0 at ×8 mode
Expansion slot configuration	▪ Insert the first 4 cards in the blue slots labeled **1**, **3**, **5**, and **7**. ▪ Insert the last 3 cards in the slots labeled **2**, **4**, and **6**.
Performance considerations	▪ 1-4 cards (in blue slots) → ×16 ▪ 5 cards → 3 ×8 + 2 ×8 ▪ 6 cards → 2 ×16 + 4 ×8 ▪ 7 cards → 1 ×16 + 6 ×8
Notes	If you install a card in PCIe ×16 slot **7**, the two front USB connectors won't be functional due to mechanical conflicts. The six USB connectors in the back are functional.

Blue Chip Ultima 2M

Supported Mura cards	2
Motherboard	BCT130 (SBC) + BP-PCIE-2M/2 (Passive Backplane)
Chipset	Intel® Q86 PCH
Processor	Intel® i7-4770S processor, 3.10 GHz
System BIOS version	2.13.1215
System memory	16 GB DDR3, 1333 MHz
Power supply	300W
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots (x16 mechanical, x16 electrical) ▪ 1 PCIe x16 2.0 slot (x16 mechanical, x1 electrical) ▪ 1 PCIe x1 2.0 slot

Expansion slot configuration	▪ Insert the first Mura MPX-4/4 card in the slot labeled **MURA1.** ▪ Insert the second Mura MPX-4/4 card in the slot labeled **MURA2.**
Notes	▪ Intel Gen 4 i3, i5, and i7 CPU options available from the supplier. ▪ Dual redundant PSU option available from the supplier.

Blue Chip Ultima 5M

Supported Mura cards	5
Motherboard	BCT120 (SBC) + BP-PCIE-5M/3 (Passive Backplane)
Chipset	Intel® Q77 PCH
Processor	Intel® Quad Core™ i5-3450 processor, 3.10 GHz
System BIOS version	2.13.1215
System memory	4 GB DDR3, 1333 MHz
Power supply	750W
Available PCIe expansion slots	▪ 5 PCIe ×16 2.0 slots ▪ 3 PCIe ×1 2.0 slots
Expansion slot configuration	▪ Insert the first Mura card in the slot labeled **PCIe9**. ▪ Insert the second Mura card in the slot labeled **PCIe7**. ▪ Insert the third Mura card in the slot labeled **PCIe5**. ▪ Insert the fourth Mura card in the slot labeled **PCIe8**. ▪ Insert the fifth Mura card in the slot labeled **PCIe6**.
Notes	▪ Intel Gen 3 i5 and i7 CPU options available from the supplier. ▪ Dual redundant PSU option available from the supplier. ▪ Memory can be upgraded to a maximum of 16 GB.

Dell® Precision™ Tower 5810 Workstation

Supported Mura cards	3 (2 MPX-4/4 + 1 P690)
Chipset	Intel® C612
Processor	Intel® Xeon® E5-1620 processor V3, 3.5 GHz
System BIOS version	A06
System memory	8 GB DDR4
Power supply	685W

Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical and electrical) ▪ 1 PCIe ×16 3.0 slot (×16 mechanical, ×8 electrical) ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot
Expansion slot configuration	▪ Insert the Mura MPX-4/4 cards in the slots labeled **SLOT2_PCIe3x16** and **SLOT4_PCIe3x16.** ▪ Insert the P690 card in the slot labeled **SLOT1_PCIe3x8.**
Possible maximum configuration	2 Mura MPX-4/4 cards + 1 P690 as console
Notes	If your Mura MPX-4/4, MPX-4/2, or MPX-4/0 card build date is before March 1, 2015, your card requires a firmware update to work with this specific system. You can find the build date of your Mura card on the backside of the card and on the product box. Please contact DWC support to update your card, if applicable.

Dell® Precision™ Workstation T3500

Supported Mura cards	2
Chipset	Intel® X58
Processor	Intel® Xeon® E5507 processor, 2.27 GHz
System BIOS version	A08
System memory	4 GB DDR3
Power supply	525W
Available PCIe expansion slots	▪ 2 PCIe ×8 slots wired as ×4 (one half-length) ▪ 2 PCIe ×16 2.0 slots
Expansion slot configuration	Insert Mura cards in slots **2** and **4** labeled **PCIe2 ×16 75W**.

Dell® Precision™ Workstation T3600

Supported Mura cards	3 (2 Mura MPX-4/4 and 1 Mura MPX-V16/MPX-V8)
Chipset	Intel® C600
Processor	Intel® Xeon® E5-1603 processor, 2.27 GHz
System BIOS version	A06
System memory	8 GB DDR3
Power supply	425W
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical and electrical) ▪ 1 PCIe ×16 3.0 slots (×16 mechanical and ×4 electrical) ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot

Expansion slot configuration	▪ Insert the Mura MPX-4/4 cards in slots labeled **SLOT2-PCIe3x16** and **SLOT4-PCIe3x16**. ▪ Insert the Mura MPX-V16/MPX-V8 card in the slot labeled **SLOT1-PCIe3x4**.
Possible maximum configuration	2 Mura MPX-4/4 cards + 1 Mura MPX-V16/MPX-V8 card
Notes	In the system BIOS, go to **Settings** → **Power Management** → **Fan Speed Control**, then select **Medium**.

Dell® Precision™ Workstation T3610

Supported Mura cards	3 (2 Mura MPX-4/4 and 1 Mura MPX-V16/MPX-V8)
Chipset	Intel® C602
Processor	Intel® Xeon® E5-1620 processor V2, 3.70 GHz
System BIOS version	A03
System memory	8 GB DDR3, 1333 Mhz
Power supply	685W
Available PCIe expansion slots	▪ 2 PCIe x16 3.0 slots (x16 mechanical, x16 electrical) ▪ 1 PCIe x16 3.0 slot (x16 mechanical, x8 electrical) ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot
Expansion slot configuration	▪ Insert the first Mura MPX-4/4 card in the slot labeled **SLOT4-PCIe3x16**. ▪ Insert the second Mura MPX-4/4 card in the slot labeled **SLOT2-PCIe3x16**. ▪ Insert the Mura MPX-V16/V8 card in the slot labeled **SLOT1-PCIe3x8**.
Notes	In the system BIOS, go to **Settings** → **Power Management** → **Fan Speed Control**, then select **Medium**.

Delo Step-PC Professional VS-Series X79

Part number	1044185
Supported Mura cards	4
Motherboard	ASUS P9X79 WS
Chipset	Intel® X79 Express
Processor	Intel® Core® i7-3930K Hexa-Core processor (S2011), max. 3.8 GHz, 12 MB cache
System memory	12 GB DDR3 dual-channel
Chassis	Delo Step Multi-View
Power supply	550W Seasonic

Available PCIe expansion slots	▪ 3 PCIe ×16 3.0/2.0 slots (dual ×16, or ×16, ×8, ×8) ▪ 1 PCIe ×16 3.0/2.0 slot (×8 mode) ▪ 2 PCIe ×16 2.0 3.0/2.0 slots (×1 mode)
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe×16_1** and **PCIe×16_4**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe 2.0 ×16_2** and **PCIe 2.0 ×16_3**.
Possible maximum configuration	4 Mura MPX-4/4 cards

Delo Step-PC Professional VS-Series Z77

Supported Mura cards	4
Motherboard	ASUS P8Z77 WS
Chipset	Intel® Z77 Express
Processor	Intel® Core® i7-3770T Quad-Core processor (S1155), max. 3.7 GHz, 8 MB cache, HD4000, 45W
System memory	8 GB DDR3 dual-channel
Chassis	Delo Step Multi-View
Power supply	550W Seasonic
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8) ▪ 2 PCIe ×1 2.0 slots
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe 3.0/2.0 ×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_1** and **PCIe 3.0/2.0 ×16_3**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_2** and **PCIe 2.0 ×16_4**.
Possible maximum configuration	4 Mura MPX-4/4 cards

HP® Z420 Workstation

Supported Mura cards	3 (2 MPX-4/4 + 1 MPX-V16)
Chipset	Intel® C602
Processor	Intel® Xeon® E5-1607 processor, 3.00 GHz Quad Core
System BIOS version	J61 V03.15
System memory	6 GB UDDR3

Power supply	600W
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical and electrical) ▪ 1 PCIe ×8 3.0 slot (×8 mechanical and electrical) ▪ 1 PCIe ×8 2.0 slot (×8 mechanical, ×4 electrical) ▪ 1 PCIe ×4 2.0 slot (×4 mechanical, ×1 electrical)
Expansion slot configuration	▪ Insert the first Mura MPX-4/4 card in the slot labeled **slot2 PCIe3 x16.** ▪ Insert the second Mura MPX-4/4 card in the slot labeled **slot5 PCIe3 x16.** ▪ Insert the Mura MPX-V16 or MPX-V8 card in the slot labeled **slot3 PCIe2 x8(4).**
Notes	A ribbon cable is required to framelock two Mura cards (P/N: F16279-00). For more information, contact your Matrox representative.

HP® Z440 Workstation

Supported Mura cards	4 (3 MPX-4/4 + 1 P690)
Chipset	Intel® C612
Processor	Intel® Xeon® E5-1680 processor, 3.20 GHz, 8 Cores
System BIOS version	V01.16
System memory	16 GB DDR4
Power supply	700W
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical and electrical) ▪ 1 PCIe ×8 3.0 slot (×16 mechanical, ×8 electrical) ▪ 1 PCIe ×4 2.0 slot (×8 mechanical, ×4 electrical) ▪ 1 PCIe ×1 2.0 slot (×4 mechanical, ×1 electrical)
Expansion slot configuration	▪ Insert the first 2 Mura MPX-4/4 card in the slot labeled **slot2** and **slot5.** ▪ Insert the third Mura MPX-4/4 card in the slot labeled **slot4.** ▪ Insert the P690 card in the slot labeled **slot3.**
Possible maximum configurations	3 Mura MPX-4/4 cards + 1 P690 as console
Notes	▪ In the system BIOS, go to **Settings → Power Management → Fan Speed Control**, then select **Medium**. ▪ If your Mura MPX-4/4, MPX-4/2, or MPX-4/0 card build date is before March 1, 2015, your card requires a firmware update to work with this specific system. You can find the build date of your Mura card on the backside of the card and on the product box. Please contact DWC support to update your card, if applicable.

HP® Z600 Workstation

Supported Mura cards	2
Chipset	Intel® 5520
Processor	Intel® Xeon® E5504 processor, 2.00 GHz
System BIOS version	786G4 v03.15
System memory	6 GB DDR3
Power supply	650W
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots ▪ 1 PCIe 2.0 slot (×8 mechanical, ×4 electrical) ▪ 1 PCIe 1.0 slot (×8 mechanical, ×4 electrical)
Expansion slot configuration	Insert Mura cards in slots **2** and **4** with green tabs labeled **PCIe2 ×16 75W**.

HP® Z620 Workstation

Supported Mura cards	2 (supports intercard transfers)
Chipset	Intel® C602
Processor	Intel® Xeon® E5-2640 processor, 2.50 GHz
System BIOS version	J61 V01.02
System memory	12 GB ECC DDR3
Power supply	800W
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots ▪ 1 PCIe ×8 3.0 slot ▪ 1 PCIe ×8 2.0 slot (×8 mechanical, ×4 electrical) ▪ 1 PCIe ×4 2.0 slot (×4 mechanical, ×1 electrical)
Expansion slot configuration	Insert Mura cards in slots labeled **PCIe3 ×16**.
Notes	▪ A ribbon cable is required to framelock two Mura cards (P/N: F16279-00). For more information, contact your Matrox representative. ▪ To remove one of the two cards, remove the module that houses the second CPU. This module hides the board retaining clip.

InoNet Magnius-II

Supported Mura cards	2 (supports intercard transfers)
Motherboard	Advantech ASMB-781
Chipset	Intel® C206

Processor	Intel® Xeon® E3-1200 processor
System BIOS version	1.1
System memory	8 GB DDR3
Power supply	500W redundant
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot
Expansion slot configuration	▪ If you're installing 1 card, insert the Mura card in the blue slot labeled **PCIE6**. ▪ If you're installing 2 cards, insert one card in the blue slot labeled **PCIE6** and the other card in the slot labeled **PCIE4**.
Performance considerations	▪ 1 card → ×16 (use the slot labeled **PCIE6**) ▪ 2 cards → ×8 (autoswitch to ×8 when slot labeled **PCIE4** is used)

Nijkerk (System MURA V1)

Supported Mura cards	7
Motherboard	ASUS® P6T7 WS
Chipset	Intel® X58 Express
Processor	Intel® Core™ i7-950 processor, 3.20 GHz
System BIOS version	1001
System memory	6 GB DDR3
Chassis	NCS-R416A-MB-NOIR
Power supply	750W
Available PCIe expansion slots	▪ Slots 1, 3, and 5 – PCIe ×16 2.0 at ×16 or ×8 mode ▪ Slot 7 – PCIe ×16 2.0 at ×16 mode ▪ Slots 2, 4, and 6 – PCIe ×16 2.0 at ×8 mode
Expansion slot configuration	▪ Insert the first 4 cards in the blue slots labeled **1**, **3**, **5**, and **7**. ▪ Insert the last 3 cards in the slots labeled **2**, **4**, and **6**.
Performance considerations	▪ 1-4 cards (blue slots) → ×16 ▪ 5 cards → 3 ×8 + 2 ×8 ▪ 6 cards → 2 ×16 + 4 ×8 ▪ 7 cards → 1 ×16 + 6 ×8
Notes	If you install a card in PCIe ×16 slot **7**, the two front USB connectors won't be functional due to mechanical conflicts. The six USB connectors in the back are functional.

Portwell® M9020B

Supported Mura cards	10
Motherboard	Portwell ROBO-8110A (SHB) PBPE-11A-MT (Backplane)
Chipset	Intel® C206
Processor	Intel® Core™ i3-2120 dual-core processor or Intel® Xeon® E3-1200 Series quad-core processor
System BIOS version	IAPB 0.04 x64
System memory	8 GB DDR3
Chassis	4U rackmount
Power supply	950W redundant PSU
Available PCIe expansion slots	10 PCIe ×16 2.0 (×16 mechanical and electrical)
Expansion slot configuration	Insert the Mura cards in the PCIe ×16.
Notes	Optional system memory upgrade is available.

Pyramid Multiplex R-19 Mura System

Part number	CPYIV-VX330A01
Supported Mura cards	2
Motherboard	Advantech ASMB-781G4-00A1E
Chipset	Intel® C206
Processor	Intel® Core™ i3-2120 processor, 3.30 GHz
System BIOS version	1.1
System memory	8 GB DDR3 1333 ATP
Power supply	500W Industrial BEA-550H
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots ▪ 1 PCIe ×4 2.0 slots ▪ 1 PCIe ×1 2.0 slots

Pyramid Multiplex S Mura System

Part number	CPYIV-BF320A01
Supported Mura cards	1 Mura MPX-4/4 (with optional Mura MPX-V16 or MPX-V8 card)
Motherboard	SB331-IPM
Chipset	Intel® Q67
Processor	Intel® Core™ i3-2120 processor, 3.30 GHz
System BIOS version	2.14.1219
System memory	8 GB DDR3
Power supply	300W
Available PCIe expansion slots	▪ 1 PCIe ×16 3.0/2.0 slot (×16 mechanical and electrical) ▪ 1 PCIe ×16 3.0/2.0 slot (×16 mechanical, ×4 electrical) ▪ 2 PCIe ×1 2.0 slots
Notes	Insert the optional Mura MPX-V16 or MPX-V8 card in the slot labeled **PCIE4**.

Seneca PrysmHD Plus

Part number	prysmHD-plus
Supported Mura cards	7
Motherboard	ASUS® X99-E WS
Chipset	Intel® X99
Processor	Intel® Core™ i7-5930K, 3.5Ghz
System BIOS version	0902
System memory	32 GB DDR4
Power supply	860W
Chassis	4U
Available PCIe expansion slots	7 PCIe ×16 3.0/2.0 slots
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_3**. ▪ If you're installing up to four cards, insert the third and fourth Mura card in the slots labeled **PCIEX16_5** and **PCIEX16_7**. ▪ If you're installing more than four cards, use the remaining available slots.
Performance considerations	▪ 1-4 cards → ×16 ▪ 7 cards → 1 ×16 + 6 ×8

Seneca VWC-4

Part number	VWC-4
Supported Mura cards	4
Motherboard	ASUS® P9X79 WS
Chipset	Intel® X79
Processor	Intel® Core™ i7, third generation processor
System BIOS version	3101
System memory	8 GB DDR3 1333 MHz
Power supply	750W single power supply option for redundant power
Chassis	4U
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8, black and blue)
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe2.0x16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe2.0x16_1** and **PCIe2.0x16_4**. ▪ If you're installing up to four cards, insert the third and fourth Mura card in the slots labeled **PCIe2.0x16_2** and **PCIe2.0x16_6**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → 4×8
Notes	For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

Synnex Canada Touch Mura X79

Part number	TOUCH MURA X79
Supported Mura cards	4
Motherboard	ASUS® P9X79 WS
Chipset	Intel® X79
Processor	Intel® Core™ i7-3820 processor, 3.60 GHz
System BIOS version	3101
System memory	8 GB DDR3 1333 MHz
Power supply	900W
Chassis	Chenbro RM422 4U

Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8, black and blue) ▪ 2 PCIe ×16 3.0/2.0 slots at ×4 mode (white)
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe2.0×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe2.0×16_1** and **PCIe2.0×16_4**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe2.0×16_2** and **PCIe2.0×16_6**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → 4 ×8
Notes	For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

Synnex Canada Touch Mura Z77

Part number	TOUCH MURA Z77
Supported Mura cards	4
Motherboard	ASUS® P8Z77 WS
Chipset	Intel® Z77 Express
Processor	Intel® Core™ i7-3770K processor, 3.50 GHz
System BIOS version	0502 ×64
System memory	8 GB DDR3
Power supply	900W
Chassis	Chenbro RM422 4U
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8) ▪ 2 PCIe ×1 2.0 slots
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe 3.0/2.0 ×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_1** and **PCIe 3.0/2.0 ×16_3**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_2** and **PCIe 2.0 ×16_4**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → 4 ×8

Notes	For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

Trenton TVC2404

Supported Mura cards	3
Motherboard	TSB 7053 (SHB), BPC8219 (Backplane)
Chipset	Intel® C206
Processor	Intel® Core® i7-3770 quad core processor 3.4 GHz
System BIOS version	0ACCI 0.08 X64
Chassis	2U rack mount
System memory	16 GB DDR3, 1600 MHz
Power supply	600W
Available PCIe expansion slots	▪ 3 PCIe ×16 2.0 slot (×16 mechanical and electrical) ▪ 1 PCIe ×16 2.0 slots (×16 mechanical and ×4 electrical)
Expansion slot configuration	Insert Mura MPX-4/4 cards in the slots labeled, **×16PCIe2, ×16PCIe3**, and **×16PCIe4**.

Trenton TVC3400

Supported Mura cards	2 (supports intercard transfers)
Motherboard	Trenton JXMS7031
Chipset	Intel® 3420
Processor	Intel® Xeon® EC5549 processor
System BIOS version	0ABYI 0.04 X64
Chassis	3U shelf mount
System memory	4 GB DDR3 Mini-DIMM
Power supply	550W
Available PCIe expansion slots	▪ 1 PCIe ×16 2.0 slot (×16 mechanical and electrical via riser card) ▪ 2 PCIe ×16 2.0 slots (×16 mechanical and ×8 electrical via riser card)
Expansion slot configuration	Insert Mura cards on the first and third slot of the riser card.

Notes	▪ The integrated graphics hardware must be disabled in Windows® Device Manager. For more information, see your system manual or Windows help. ▪ The mouse pointer may stutter or freeze when it's moved over a display. To fix this, try reinstalling the network adapter driver. ▪ This system is only supported with Mura fanless SKUs. For more information, contact your Matrox representative. ▪ Optional system memory upgrade is available.

Trenton TVC4400

Supported Mura cards	2 (supports intercard transfers)
Motherboard	Trenton JXMS7031
Chipset	Intel® 3420
Processor	Intel® Xeon® EC5509 processor, quad-core 2.00 GHz
System BIOS version	0ABYI 0.04 X64
Chassis	4U shelf mount
System memory	4 GB DDR3 Mini-DIMM
Power supply	550W
Available PCIe expansion slots	▪ 1 PCIe ×16 2.0 slot (×16 mechanical and electrical) ▪ 2 PCIe ×16 2.0 slots (×16 mechanical and ×8 electrical)
Expansion slot configuration	Insert the two Mura cards in the slots labeled **PCIe2** and **PCIe3**.
Notes	▪ The integrated graphics hardware must be disabled in Windows® Device Manager. For more information, see your system manual or Windows help. ▪ Optional system memory upgrade is available.

Trenton TVC4403

Supported Mura cards	9
Motherboard	JXTS6966/TSB7053 (SHB) BPG7087 (Backplane)
Chipset	Intel® 3420 (JXTS6966) Intel® C206 (TSB7053)
Processor	Quad-Core Intel® Xeon® EC5500 Series (JXTS6966) 3rd Generation Intel® i7 Quad-Core CPU (TSB7053) Intel® Xeon® E-3 1200 Series Quad-Core CPU (TSB7053)
System BIOS version	0ACAR004 (JXTS6966) TTICIM08.ROM (TSB7053)
System memory	4 GB DDR3

Chassis	4U rack mount
Power supply	800W redundant
Available PCIe expansion slots	▪ 4 PCIe ×16 2.0 slots ▪ 6 PCIe ×4 2.0 slots (no intercard transfers)
Expansion slot configuration	▪ If you're installing up to 4 cards, insert the Mura cards in the slots labeled **PCIe4**, **PCIe6**, **PCIe8**, and **PCIe10**. ▪ If you're using more than 4 cards, insert the Mura cards in the remaining slots (except the slot labeled **PCIe2**, as it requires an add-in module).
Performance considerations	▪ 1-4 cards → ×16 ▪ 5 cards → 4 ×16 + 1 ×4 ▪ 6 cards → 4 ×16 + 2 ×4 ▪ 7 cards → 4 ×16 + 3 ×4 ▪ 8 cards → 4 ×16 + 4 ×4 ▪ 9 cards → 4 ×16 + 5 ×4
Notes	▪ While using up to 4 cards, the slot labeled **PCIe4** is used for the primary display. ▪ The integrated graphics hardware must be disabled in Windows® Device Manager. For more information, see your system manual or Windows help. ▪ While using more than 4 cards, if both slots labeled **PCIe3** and **PCIe4** are used, **PCIe3** is used for the primary display. ▪ Optional system memory upgrade is available. ▪ Check with supplier for available CPU options.

Trenton TVC4406

Supported Mura cards	4
Motherboard	ASUS® P9X79 WS
Chipset	Intel® X79
Processor	Intel® Core™ i7-3820 processor, 3.8 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink for the CPU
System BIOS version	0603 X64 dated 11/11/2011
System memory	4 GB DDR3
Chassis	4U rack mount
Power supply	800W redundant
Power supply bracket	Standard with the Trenton chassis
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8, black and blue) ▪ 2 PCIe ×16 3.0/2.0 slots at ×4 mode (white)

Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe2.0×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe2.0×16_1** and **PCIe2.0×16_4**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe2.0×16_2** and **PCIe2.0×16_6**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → ×8
Notes	For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

Trenton TVC4502

Supported Mura cards	1
Motherboard	Trenton JXMI8001
Chipset	Intel® 3420
Processor	Intel® Xeon® EC5509 quad-core processor, 2.00 GHz
System BIOS version	0ABYI 0.04 X64
System memory	4 GB DDR3 Mini-DIMM
Chassis	4U rack mount
Power supply	550W
Power supply bracket	Standard with the Trenton chassis
Available PCIe expansion slots	2 PCIe ×16 2.0 slots (×16 mechanical, ×8 electrical)

Trenton TVC5401

Supported Mura cards	16 (max. 29 GPUs)
Motherboard	JXTS6966/TSB7053 (SHB) BPG8032 (Backplane)
Chipset	Intel® 3420 (JXTS6966) Intel® C206 (TSB7053)
Processor	Intel® Xeon® EC5500 Series (single or dual), Quad-Core (JXTS6966) 3rd Generation Intel® i7 Quad-Core CPU (TSB7053) Intel® Xeon® E-3 1200 Series Quad-Core CPU (TSB7053)
System BIOS version	0ACAR004 (JXTS6966) TTICIM08.ROM (TSB7053)
System memory	4 GB DDR3

Chassis	5U rack mount
Power supply	1485W Redundant
Available PCIe expansion slots	▪ 17 PCIe ×16 2.0 slots (mechanical and electrical) ▪ 1 PCIe ×16 2.0 slots (mechanical, ×4 electrical)
Expansion slot configuration	▪ If you're installing up to 14 Mura MPX-4/4 cards, insert the Mura cards in the slots labeled **PCIe18** to **PCIe5**. ▪ If you're installing up to 2 Mura MPX-V16 cards, insert the Mura cards in the slots labeled **PCIe4** and **PCIe3**.
Possible maximum configurations	▪ 14 Mura MPX-4/4 cards + 2 Mura MPX-V16 cards ▪ 10 Mura MPX-4/4 cards + 6 Mura MPX-V16 cards
Notes	▪ Optional dual CPU configuration is available. ▪ The integrated graphics hardware must be disabled in Windows® Device Manager. For more information, see your system manual or Windows help. ▪ The maximum number of GPUs supported by Windows is 29. ▪ Due to a mechanical conflict with the SHB, slots labeled **PCIe1** and **PCIe2** aren't functional. ▪ Optional system memory upgrade is available.

Trenton TVC5402

Supported Mura cards	10 (8 MPX-4/4 + 1 MPX-V16 + 1 P690)
Motherboard	TSB7053 (SHB) BPG8194 (Backplane)
Chipset	Intel® C206
Processor	Intel® Core i7-3770, 3.4 GHz, Quad-Core
System BIOS version	V2.7
System memory	8 GB DDR3
Chassis	5U rack mount
Power supply	1200W Redundant
Available PCIe expansion slots	▪ 8 PCIe ×16 3.0 slots (mechanical and electrical) ▪ 5 PCIe ×16 3.0 slots (mechanical, ×4 electrical)
Expansion slot configuration	▪ If you're installing up to 8 Mura MPX-4/4 cards, insert the Mura cards in the slots labeled **PCIe2** to **PCIe5**, **PCIe7**, **PCIe9**, **PCIe11**, and **PCIe13**. ▪ If you're installing a Mura MPX-V16 card, insert the Mura card in the slot labeled **PCIe12**. ▪ If you're installing a P690 card, insert the card in the slot labeled **PCIe10**.
Possible maximum configurations	8 Mura MPX-4/4 cards + 1 Mura MPX-V16 card + 1 P690 as console

Notes	▪ The integrated graphics hardware must be disabled in Windows® Device Manager. For more information, see your system manual or Windows help. ▪ Optional system memory upgrade is available.

Validated motherboards

The following motherboards have been validated:

- "Advantech ASMB-781G4-00A1E", page 34
- "ASRock ASRock X79 Extreme 11", page 35
- "ASUS® P6T7 WS", page 36
- "ASUS® P6X58-E WS", page 38
- "ASUS® P8Z77 WS", page 39
- "ASUS® P9X79 Pro", page 40
- "ASUS® P9X79-E WS", page 42
- "ASUS® P9X79 WS", page 43
- "ASUS® Z87 WS", page 44
- "ASUS® X99-A", page 46
- "ASUS® X99-DELUXE", page 47
- "Gigabyte™ G1 Sniper3", page 49
- "Gigabyte™ GA-X79-UD3", page 51
- "Portwell® M9010A", page 52

Advantech ASMB-781G4-00A1E

Supported Mura cards	2
Motherboard	Advantech ASMB-781G4-00A1E
Chipset	Intel® C206
Processor	Intel® Xeon® E3-1275 processor
Heatsink (for CPU)	Advantech LGA1155 CPU Heat Sink (P/N: 1960047669N001)
System BIOS version	1.10
System memory	8 GB DDR3
Chassis	IPC-7130-00XE
Power supply	PS-400ATX-ZE (400W 80 PLUS PS/2 PSU)
Power supply bracket	Standard
Available PCIe expansion slots	▪ 2 PCIe ×16 2.0 slots ▪ 1 PCIe ×4 2.0 slot ▪ 1 PCIe ×1 2.0 slot

Expansion slot configuration	▪ Insert the first Mura card in the blue slot labeled **PCIE6**. ▪ Insert the second Mura card in the blue slot labeled **PCIE4**.

Advantech ASMB-820I-00A1E

Supported Mura cards	3 (2 Mura MPX-4/4 and 1 Mura MPX-V16/MPX-V8)
Motherboard	Advantech ASMB-820I-00A1E
Chipset	Intel® C206J
Processor	Intel® Xeon® E5-2420 processor
Heatsink (for CPU)	Advantech LGA1356 CPU Heat Sink (P/N: 19600555362N011)
System BIOS version	1.10
System memory	8 GB DDR3
Chassis	ACP-4000MB-00XE
Power supply	80 PLUS 500 W PSU (Ps8-500ATX-ZE)
Power supply bracket	Standard
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots (×16 mechanical, ×16 and ×8 electrical) ▪ 1 PCIe ×4 2.0 slot (×4 mechanical, ×4 electrical) ▪ 1 PCIe ×1 2.0 slot (×1 mechanical, ×1 electrical)
Expansion slot configuration	▪ If you're installing up to 2 Mura MPX-4/4 cards, insert the first Mura card in the blue slot labeled **PCIE6**. Insert the second Mura card in the blue slot labeled **PCIE4**. ▪ If you're installing 1 Mura MPX-V16/MPX-V8 card, insert the Mura card in the slot labeled **PCIE3**.

ASRock ASRock X79 Extreme 11

Supported Mura cards	4
Motherboard	ASRock X79 Extreme 11
Chipset	Intel® X79
Processor	Intel® Core® i7 3939K, 3.2 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink
System BIOS version	1.4
System memory	8 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	7 PCIe ×16 3.0 slots (PCIE1/PCIE2/PCIE3/PCIE4/PCIE5/PCIE6/PCIE7: x16/0/16/0/16/0/16 mode or x16/8/8/8/8/8/8 mode)
Expansion slot configuration	▪ Insert the first Mura card in the slot labeled **PCIE1**. ▪ Insert the second Mura card in the slot labeled **PCIE5**. ▪ Insert the third Mura card in the slot labeled **PCIE3**. ▪ Insert the fourth Mura card in the slot labeled **PCIE7**.
Performance considerations	1-4 cards → ×16
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65.

ASUS® P6T7 WS

Supported Mura cards	7
Motherboard	ASUS® P6T7 WS

Chipset	Intel® X58
Processor	Intel® Core™ i7-950 processor, 3.06 GHz
Heatsink (for CPU)	LGA 1366 fan heatsink for Intel® Core™ i7 processor
System BIOS version	0904 dated 09/24/2010
System memory	6 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	  OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ Slots 1, 3, and 5 – PCIe ×16 2.0 at ×16 or ×8 mode ▪ Slot 7 – PCIe ×16 2.0 at ×16 mode ▪ Slots 2, 4, and 6 – PCIe ×16 2.0 at ×8 mode
Expansion slot configuration	▪ Insert the first four Mura cards in the blue slots labeled **1**, **3**, **5**, and **7**. Insert the next three Mura cards in slots **2**, **4**, or **6**. ▪ Installing more than four cards requires a new bracket and a 120 CFM fan for the front.
Performance considerations	▪ 1-4 cards (in blue connectors) → ×16 ▪ 5 cards → 3 ×16 + 2 ×8 ▪ 6 cards → 2 ×16 + 4 ×8 ▪ 7 cards → 1 ×16 + 6 ×8

Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ If you install a card in PCIe ×16 slot **7**, the two front USB connectors won't be functional due to mechanical conflicts. The six USB connectors in the back are functional.

ASUS® P6X58-E WS

Supported Mura cards	5
Motherboard	ASUS® P6X58-E WS
Chipset	Intel® X58
Processor	Intel® Core™ i7-950 Quad processor, 3.07 GHz
Heatsink (for CPU)	LGA 1366 fan heatsink for the CPU
System BIOS version	0301 dated 2/22/2011
System memory	12 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	  OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 1 PCIe ×16 2.0 slot at ×16 mode ▪ 2 PCIe ×16 2.0 slots at ×16 or ×8 mode ▪ 2 PCIe ×16 2.0 slots at ×8 mode ▪ 1 PCIe ×16 2.0 slot at ×1
Expansion slot configuration	▪ Insert the first Mura card in the slot labeled **PCIe2.0×16_1**. ▪ Insert the second and third Mura card in the slots labeled **PCIe2.0×16_3** and **PCIe2.0×16_5**. ▪ Insert the fourth and fifth Mura cards in the slots labeled **PCIe2.0×16_2** and **PCIe2.0×16_4**.
Performance considerations	▪ 1-3 cards → ×16 ▪ 4 cards → 2 ×16 + 2 ×8 ▪ 5 cards → 1 ×16 + 4 ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65.

ASUS® P8Z77 WS

Supported Mura cards	4
Motherboard	ASUS® P8Z77 WS
Chipset	Intel® Z77 Express
Processor	Intel® Core™ i7-3770K processor, 3.5 GHz
Heatsink (for CPU)	LGA 1155 fan heatsink for the CPU
System BIOS version	0502 ×64
System memory	8 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA – ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP) ***OR*** ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8) ▪ Advantech – Use the 700W power supply included with the chassis.
Power supply bracket	▪ iStarUSA – ▪ Redundant power supply – Use the bracket included with the power supply. ▪ Regular power supply – Use the standard bracket included with the chassis. ▪ Advantech – Use the standard bracket included with the chassis.
Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16/×8/×8, or quad ×8) ▪ 2 PCIe ×1 2.0 slots
Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIe 3.0/2.0 ×16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_1** and **PCIe 3.0/2.0 ×16_3**. ▪ If you're installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe 3.0/2.0 ×16_2** and **PCIe 2.0 ×16_4**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

ASUS® P9X79 Pro

Supported Mura cards	3
Motherboard	ASUS® P9X79 Pro
Chipset	Intel® X79

Processor	Intel® Core™ i7-3930K processor, 3.2 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink for the CPU
System BIOS version	1104 X64 dated 04/10/2012
System memory	16 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 3 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8) ▪ 1 PCIe ×16 3.0/2.0 slot at ×8 mode ▪ 2 PCIe ×16 3.0/2.0 slots at ×1 mode
Expansion slot configuration	▪ If you’re installing one card, insert the Mura card in the slot labeled **PCIe×16_1**. ▪ If you’re installing two cards, insert the Mura cards in the slots labeled **PCIe×16_1** and **PCIe×16_4**. ▪ If you’re installing three cards, insert the Mura cards in the slots labeled **PCIe×16_1**, **PCIe×16_2**, and **PCIe×16_4**.

Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

ASUS® P9X79-E WS

Supported Mura cards	6
Motherboard	ASUS® P9X79-E WS
Chipset	Intel® X79
Processor	Intel® Core™ i7-3820 processor, 3.6 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink for the CPU
System BIOS version	1103 X64
System memory	4 GB DDR3
Chassis	▪ iStarUSA Kit 1 + Kit 2 ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80) ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
Power supply	▪ iStarUSA – ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP) ***OR*** ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
Power supply bracket	▪ iStarUSA – ▪ Redundant power supply – Use the bracket included with the power supply. ▪ Regular power supply – Use the standard bracket included with the chassis.
Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65.
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0 slots at ×16 mode (blue) ▪ 3PCIe ×16 3.0 slot at ×8 mode (black)

Expansion slot configuration	▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_5**. ▪ If you're installing three cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_3**, and **PCIEX16_5**. ▪ If you're installing four cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_3**, **PCIEX16_5**, and **PCIEX16_7**. ▪ If you're installing up to 6 cards, insert the remaining two cards in the slots labeled **PCIEX16_2** and **PCIEX16_6**.
Performance considerations	▪ 1-4 cards → ×16 ▪ 5 cards → 2 ×16 + 3 ×8 ▪ 6 cards → 2 ×16 + 4 ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65.

ASUS® P9X79 WS

Supported Mura cards	4
Motherboard	ASUS® P9X79 WS
Chipset	Intel® X79
Processor	Intel® Core™ i7-3930K processor, 3.2 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink for the CPU
System BIOS version	0603 X64 dated 11/11/2011
System memory	8 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8, black and blue) ▪ 2 PCIe ×16 3.0/2.0 slots at ×4 mode (white)
Expansion slot configuration	▪ If you’re installing one card, insert the Mura card in the slot labeled **PCIe2.0×16_1**. ▪ If you’re installing two cards, insert the Mura cards in the slots labeled **PCIe2.0×16_1** and **PCIe2.0×16_4**. ▪ If you’re installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIe2.0×16_2** and **PCIe2.0×16_6**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

ASUS® Z87 WS

Supported Mura cards	4
Motherboard	ASUS® Z87 WS
Chipset	Intel® Z87
Processor	Intel® Core™ i7-477K processor, 3.5 GHz
Heatsink (for CPU)	LGA 1150 fan heatsink for the CPU
System BIOS version	0904 X64
System memory	4 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65.
Available PCIe expansion slots	▪ 4 PCIe ×16 3.0/2.0 slots (dual ×16 or ×16, ×8, ×8, or quad ×8) ▪ 2 PCIe ×1 2.0 slots
Expansion slot configuration	▪ If you’re installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you’re installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_3**. ▪ If you’re installing three cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_2**, and **PCIEX16_3**. ▪ If you’re installing up to four cards, insert the fourth Mura card in the slot labeled **PCIEX16_4**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ For two-card configurations, a longer ribbon cable (for framelock) is required (P/N: F16279-00). For more information, contact your Matrox representative.

ASUS® X99-A

Supported Mura cards	3
Motherboard	ASUS® X99-A
Chipset	Intel® X99
Processor	▪ Intel® Core™ i7-5820K processor, 3.3 GHz (28 lane CPU) ▪ Intel® Core™ i7-5930K processor, 3.3 GHz (40 lane CPU)
Heatsink (for CPU)	LGA 2011-V3
System BIOS version	1601
System memory	8 GB DDR4, 2133 MHz

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65.

Available PCIe expansion slots	▪ 40 lane CPU –
	  ▪ 3 PCIe ×16 3.0/2.0 slots (one ×16, two ×16/×16, three ×16/×16/×8)
	  ▪ 1 PCIe ×16 2.0 slot (maximum ×4 mode)
	  ▪ 2 PCIe ×1 2.0 slots
	▪ 28 lane CPU –
	  ▪ 3 PCIe ×16 3.0/2.0 slots (one ×16, two ×16/×8, three ×16/×8/×4)
	  ▪ 1 PCIe ×16 2.0 slot (maximum ×4 mode)
	  ▪ 2 PCIe ×1 2.0 slots

Expansion slot configuration	▪ 40 lane CPU –
	  ▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**.
	  ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_3**.
	  ▪ If you're installing three cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_3**, and **PCIEX16_4**.
	▪ 28 lane CPU –
	  ▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**.
	  ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_3**.

Performance considerations	▪ 40 lane CPU –
	  ▪ 1-2 cards → ×16
	  ▪ 3 cards → 2 ×16 + 1 ×8
	▪ 28 lane CPU –
	  ▪ 1 card → ×16
	  ▪ 2 cards → 1 ×16 + 1×8

Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ For more information on supported chassis, see "Validated chassis", page 53.

ASUS® X99-DELUXE

Supported Mura cards	5
Motherboard	ASUS® X99-DELUXE
Chipset	Intel® X99
Processor	▪ Intel® Core™ i7-5820K processor, 3.3 GHz (28 lane CPU) ▪ Intel® Core™ i7-5930K processor, 3.3 GHz (40 lane CPU)
Heatsink (for CPU)	LGA 2011-V3
System BIOS version	1601
System memory	8 GB DDR4, 2133 MHz

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.

Power supply	▪ iStarUSA – ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP) ***OR*** ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
Power supply bracket	▪ iStarUSA – ▪ Redundant power supply – Use the bracket included with the power supply. ▪ Regular power supply – Use the standard bracket included with the chassis.
Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65.
Available PCIe expansion slots	▪ 40 lane CPU – ▪ 5 PCIe ×16 3.0/2.0 slots (one ×16, two ×16/×16, three ×16/×16/×8, four ×8/×8/×16/×8, five ×8/×8/×8/×8/×8) ▪ 1 PCIe ×16 2.0 slot (maximum ×4 mode) ▪ 28 lane CPU – ▪ 3 PCIe ×16 3.0/2.0 slots (one ×16, two ×16/×8, three ×8/×8/×8) ▪ 1 PCIe ×16 2.0 slot (maximum ×4 mode) ▪ 2 PCIe ×1 2.0 slots (×1 mode)
Expansion slot configuration	▪ 40 lane CPU – ▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_3**. ▪ If you're installing three cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_3**, and **PCIEX16_5**. ▪ If you're installing more than three cards, insert the remaining Mura cards in the slots labeled **PCIEX16_2** and **PCIEX16_4**. ▪ 28 lane CPU – ▪ If you're installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you're installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_4**. ▪ If you're installing three cards, insert the Mura cards in the slots labeled **PCIEX16_1**, **PCIEX16_2**, and **PCIEX16_4**.

Performance considerations	▪ 40 lane CPU –
	  ▪ 1-2 cards → ×16
	  ▪ 3 cards → 2×16 + 1×8
	  ▪ 4 cards → 1 ×16 + 3 ×8
	  ▪ 5 cards → 5 ×8
	▪ 28 lane CPU –
	  ▪ 1 card → ×16
	  ▪ 2 cards → 1 ×16 + 1×8
	  ▪ 3 cards → 3 ×8

Notes	▪ If you're using the 40 lane CPU, you need to change the default BIOS settings. Under **Advance Mode**, select **Tool**, then set the bandwidth of the **PCIEX16_5 slot** (black) to **×8 Modex-AMI**. This enables the slot to run in ×8 mode. ▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65. ▪ For more information on supported chassis, see "Validated chassis", page 53.

Gigabyte™ G1 Sniper3

Supported Mura cards	4
Motherboard	Gigabyte G1 Sniper3
Chipset	Intel® Z77 Express
Processor	Intel® Core™ i7-3770 processor, 3.4 GHz
Heatsink (for CPU)	LGA 1155 fan heatsink for the CPU
System BIOS version	AMI version F5
System memory	8 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	  OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots at ×16 mode ▪ 2 PCIe ×16 3.0 slots at ×8 mode ▪ 2 PCIe ×16 2.0 slots at ×1 mode
Expansion slot configuration	▪ If you’re installing one card, insert the Mura card in the slot labeled **PCIEX16_1**. ▪ If you’re installing two cards, insert the Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_2**. ▪ If you’re installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIEX8_1** and **PCIEX8_2**.
Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 1 ×16 + 2 ×8 ▪ 4 cards → ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ For multi-card configurations, longer ribbon cables (for framelock) are required (P/N: F16279-00). For more information, contact your Matrox representative.

Gigabyte™ GA-X79-UD3

Supported Mura cards	4
Motherboard	Gigabyte GA-X79-UD3
Chipset	Intel® X79 Express
Processor	Intel® Core™ i7-3820 processor, 3.7 GHz
Heatsink (for CPU)	LGA 2011 fan heatsink for the CPU
System BIOS version	AMI version F10 (build date: 03/05/2012)
System memory	16 GB DDR3

Chassis	▪ iStarUSA Kit 1 + Kit 2
	  ▪ iStarUSA Kit 1 – 400 chassis with black doors and 2x 80mm fans (P/N: D-400-2F80)
	  ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
	▪ Advantech (P/N: C-MAT1A-ACP4010-01)

Power supply	▪ iStarUSA –
	  ▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP)
	  OR
	  ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
	▪ Advantech – Use the 700W power supply included with the chassis.

Power supply bracket	▪ iStarUSA –
	  ▪ Redundant power supply – Use the bracket included with the power supply.
	  ▪ Regular power supply – Use the standard bracket included with the chassis.
	▪ Advantech – Use the standard bracket included with the chassis.

Fan	▪ iStarUSA – 120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65. ▪ Advantech – Included with chassis.
Available PCIe expansion slots	▪ 2 PCIe ×16 3.0 slots at ×16 mode ▪ 2 PCIe ×16 3.0 slots at ×8 mode ▪ 2 PCIe ×16 2.0 slots at ×1 mode
Expansion slot configuration	▪ If you’re installing two cards, insert Mura cards in the slots labeled **PCIEX16_1** and **PCIEX16_2**. ▪ If you’re installing up to four cards, insert the third and fourth Mura cards in the slots labeled **PCIEX8_1** and **PCIEX8_2**.

Performance considerations	▪ 1-2 cards → ×16 ▪ 3 cards → 2 ×16 + 1×8 ▪ 4 cards → ×8
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see "Approved fans for iStarUSA® chassis", page 65.

Portwell® M9010A

Supported Mura cards	10
Motherboard	Portwell ROBO-8110A (SHB) PBPE-11A-MT (Backplane)
Chipset	Intel® C206
Processor	Intel® Core™ i3-2120 dual-core processor or Intel® Xeon® E3-1200 Series quad-core processor
Heatsink (for CPU)	Low-profile 1U passive heatsink
System BIOS version	IAPB 0.04 ×64
System memory	8 GB DDR3
Chassis	Industrial 4U rack mount (not included)
Power supply	950 W redundant PSU (not included)
Power supply bracket	Standard
Available PCIe expansion slots	10 PCIe ×16 2.0 slots (×16 mechanical and electrical)
Expansion slot configuration	Insert the Mura cards in the available PCIe ×16 slots.
Notes	Optional system memory upgrade is available.

Validated chassis

The following chassis have been validated:

- "Advantech ACP-4000MB-00XE", page 53
- "Advantech C-MAT1A-ACP4010-01", page 53
- "Advantech IPC-7130-00XE", page 54
- "Chenbro RM41300-FS81", page 54
- "Delo Step Multi-View", page 54
- "iStarUSA®", page 55
- "Nijkerk NCS-R416A-MB-NOIR", page 55
- "Supermicro® SuperChassis 836", page 56
- "Supermicro® SuperChassis 842XTQ-R606B", page 56

Advantech ACP-4000MB-00XE

Cards supported (maximum)	3
Part number	ACP-4000MB-00XE (Includes chassis, 500W power supply, and fans.)
Power supply	500W (Included, see part number)
Power supply bracket	Standard
Supported motherboards	Advantech ASMB-820

Advantech C-MAT1A-ACP4010-01

Cards supported (maximum)	7
Part number	C-MAT1A-ACP4010-01 (Includes chassis, 700W power supply, and fans.)
Power supply	700W (Included, see part number)
Power supply bracket	Standard
Supported motherboards	▪ ASRock X79 Extreme 11 ▪ ASUS® P6T7 WS ▪ ASUS P6X58-E WS ▪ ASUS P8Z77 WS ▪ ASUS P9X79 Pro ▪ ASUS P9X79 WS ▪ Gigabyte G1.Sniper3 ▪ Gigabyte GA-X79-UD3

Advantech IPC-7130-00XE

Cards supported (maximum)	2
Part number	IPC-7130-00XE
Power supply	PS-400ATX-ZE (400W 80 PLUS PS/2 PSU)
Power supply bracket	Standard
Supported motherboards	Advantech ASMB-781G4-00A1E

Chenbro RM41300-FS81

Cards supported (maximum)	7
Part number	RM41300-FS81 (Includes chassis and fans. Power supply not included.)
Power supply	750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
Power supply bracket	Standard
Supported motherboards	▪ ASUS® P6T7 WS ▪ ASUS® P9X79 Pro ▪ ASUS® P9X79 WS ▪ ASUS® P9X79-E WS ▪ ASUS® P8Z77 WS ▪ ASUS® P6X58-E WS ▪ ASUS® Z87 WS ▪ ASUS® X99-A ▪ ASUS® X99-DELUXE

Delo Step Multi-View

Cards supported (maximum)	4
Part number	1039268 (Includes chassis, 560W power supply, and fans.)
Power supply	Seasonic X-Series (560W), model SS-560KM
Power supply bracket	Standard
Supported motherboards	▪ ASUS® P9X79 WS ▪ ASUS® P8Z77 WS

iStarUSA®

Cards supported (maximum)	7
Part number (to be ordered from iStarUSA)	▪ iStarUSA Kit 1 – 400 chassis with black doors and 2× 80mm fans (P/N: D-400-2F80) ▪ iStarUSA Kit 2 – Custom fan bracket (P/N: DD-FANGUARD-12-MAT01). For more information on how to properly install the fan bracket, contact Matrox Technical Support.
Power supply (to be ordered from iStarUSA)	▪ 800W iStarUSA redundant power supply with mounting bracket for D-400 (P/N: IS-800R3NP) ***OR*** ▪ 750W iStarUSA single regular power supply (P/N: TC-750PD1 or TC-750PD8)
Power supply bracket	▪ Redundant power supply – Use the bracket included with the power supply. ▪ Regular power supply – Use the standard bracket included with the chassis.
Fan	120 CFM fan (front fan assembly). Fan to be ordered separately from the list of approved vendors. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65.
Supported motherboards	▪ ASRock X79 Extreme 11 ▪ ASUS® P6T7 WS ▪ ASUS P6X58-E WS ▪ ASUS P8Z77 WS ▪ ASUS P9X79 Pro ▪ ASUS P9X79-E WS ▪ ASUS P9X79 WS ▪ ASUS® Z87 WS ▪ Gigabyte G1.Sniper3 ▪ Gigabyte GA-X79-UD3
Notes	▪ iStarUSA – The chassis and power supply must be ordered from iStarUSA. ▪ The fan must be ordered from a separate fan vendor. For more information on approved fans and fan vendors, see “Approved fans for iStarUSA® chassis”, page 65.

Nijkerk NCS-R416A-MB-NOIR

Cards supported (maximum)	7
Part number	NCS-R416A-MB-NOIR
Power supply	Antec HCP-750 (750W)
Power supply bracket	Standard
Supported motherboards	ASUS® P6T7 WS

Supermicro® SuperChassis 836

Cards supported (maximum)	3
Part number	CSE-836 (Includes chassis, 800W redundant power supply, and fans.)
Power supply	ABLECOM (800W redundant), model PWS-801-1R
Power supply bracket	Standard
Supported motherboards	ASUS® P9X79 Pro

Supermicro® SuperChassis 842XTQ-R606B

Cards supported (maximum)	7
Part number	CSE-842XTQ-R606B (Includes chassis, 600W redundant power supply, and fans.)
Power supply	600W redundant, model PWS-606P-1R
Power supply bracket	Standard
Supported motherboards	▪ ASUS® P6T7 WS ▪ ASUS® P6X58-E WS ▪ ASUS® P8Z77 WS ▪ ASUS® P9X79 Pro ▪ ASUS® P9X79-E WS ▪ ASUS® P9X79 WS ▪ ASUS® Z87 WS ▪ ASUS® X99-A ▪ ASUS® X99-DELUXE

Power supply sizing for Matrox Mura MPX-based systems

When assembling a system based on Mura MPX Series products, the power supply must be sized to provide power for the entire system, including the CPU, all add-in cards, and any peripherals connected. To determine the power supply size, you must consider not only the power requirements of all devices but also the power rails from which the current is being drawn.

Each power supply provides different voltages with varying current load capacities, depending on system usage. For example, a -12V supply (still used in some systems) supports less than 1A of load, whereas a +12V supply, which bears the brunt of the load in modern systems, can easily exceed 50A capacity in many mid-sized power supplies. The remaining voltages (typically, +3.3V, +5V, and +5VSB) fall between these extremes in terms of current load capacity.

Mura cards, being PCI Express-based, draw power primarily from the +12V supply. Although a small amount of power (approximately 0.1A) is drawn from the +3.3V supply, the power supply must have sufficient capacity on the +12V supply rail. Since each Mura SKU has slightly different power supply requirements, using the largest possible current requirement to size the power supply will ensure the power supply is adequate, regardless of the SKUs installed.

To properly size the power supply, the power requirements of all the devices must be added together separately for each supply rail and then the appropriate power supply selected. For example, the Mura MPX-4/4 SKU (4 outputs, 4 inputs) consumes approximately 3.5A from the +12V supply. Seven Mura MPX-4/4 cards would therefore consume approximately 24.5A (or 7 x 3.5A) from this supply. This +12V current requirement is in addition to any pre-existing requirements of the motherboard and/or system (for example, CPU, motherboard, hard disk drives, etc.). In other words, if the base system requires 15A from the +12V supply with no Mura cards installed, once the Mura cards are installed the power supply must provide 15A + 24.5A (or 39.5A) on the +12V rail for adequate power supply.

A merely “adequate” power supply, however, isn’t sufficient. Most power supplies operate at optimal efficiency at 50-60% of their rated power load. Continually operating beyond this may cause excessive thermal generation and lead to premature aging of the electronic components. It’s common practice to ensure that the power supply can supply additional current beyond what’s required for the system configuration in typical use. For maximum efficiency and reliability, make sure to provide a minimum 50% margin on the power supply rating. In the example above, a system requiring 39.5A on the +12V rail would require approximately 475W. Assuming another 50W for the +3.3V rail and 10W for the +5V rail, the total system requirements are approximately 475W + 50W + 10W, for a total of 535W. A 50% margin on the power supply means specifying a supply of 800W that can supply at least 60A on the +12V supply.

By providing less margin than specified above, the power supply will be used under higher load conditions, which may lead to excess heat generation within the power supply and premature wear-out of electronic components. Insufficient margin may also compromise the overall reliability of the product.

Note: The margin provided on the power supply must never be less than 35-40%.

For a common Mura MPX setup that supports up to seven Mura cards and uses a mid-range Intel CPU, we recommend a minimum power supply of 800W. For larger systems, the power supply must be increased accordingly, taking into account the requirements of the CPU or SHB and backplane/motherboard components.

System ventilation

Without proper system ventilation, the motherboard and add-in cards will operate at elevated temperatures. Continued operation at elevated temperatures may reduce the life expectancy of the overall system. Mechanical components (such as fans), in particular, experience higher failure rates when exposed to elevated temperatures over long periods of time. The system integrator must verify that the system – and the add-in card area in particular – is properly ventilated. The result is a system that runs cooler, has a longer operating life, and offers higher reliability.

Note: To guarantee the longevity of your system and the installed fanless Mura MPX Series cards, make sure your system is installed in a properly ventilated location. When the Mura card is installed in a properly ventilated ***system*** with a ***maximum ambient room temperature*** of 25 °C, the temperature of the Mura card recorded by Matrox PowerDesk software shouldn't exceed 80 °C. Matrox recommends that the ***ambient room temperature*** should never exceed ***40 °C*** and that the ***Mura card temperature*** should never exceed ***100 °C***.

Running the Matrox Mura MPX Series card above the specified temperatures will lead to permanent damage to the card that won't be covered by the Matrox warranty. To monitor and record the temperature changes of your graphics hardware, use Matrox PowerDesk software. From the main interface, click **Help and Troubleshooting → Troubleshoot**. Under **Chip temperature data and logging**, you can enable the options to monitor the peak temperatures or log the chip temperatures of your graphics hardware.

Systems validated by Matrox have guaranteed thermal and ventilation characteristics.

For more information on ensuring proper system ventilation, see the Matrox Chassis Selection Guide.

PCI Express® bandwidth considerations in Matrox Mura MPX-based systems

System architecture is important in determining overall capture and display performance with Mura-MPX based systems. Although the input resolutions and formats must be considered, the system bus-level architecture also plays an important role in optimizing the system for the best possible performance. This section will outline some of the issues to consider when implementing Mura-MPX based display wall architectures.

Input source bandwidth requirements

Any capture architecture receives its data from external sources and transfers it to one or more graphics engines for display. The inputs may take many forms: analog RGB, component video, DVI, or even standard TV inputs using either composite or Y/C signals. Each of these inputs places a different load on the system in terms of quantity of data to be transferred. Each input type is also associated with a default data format: analog RGB and DVI are typically transferred in 24-bit RGB, whereas composite and Y/C video data are generally transferred in 16-bit YUV. Understanding the different transmission formats and their bandwidth requirements can help guide the integrator in setting up and configuring a Mura-MPX based capture system.

The bandwidth required by any input source can be expressed as follows:

$$BW = \mathrm{Re}\, s_x \times \mathrm{Re}\, s_y \times fps \times Bytes_{Pixel}$$

where the values ***fps*** and ***BytesPixel*** represent the number of frames per second and the number of bytes taken by each pixel, respectively. In analog RGB, component and DVI modes each pixel generally requires 4 bytes. In TV modes (or when data is represented as 16-bit YUV data) each pixel requires 2 bytes.

For example, a high-definition source being captured at 1920×1080p60 requires

$$BW_{1080\,p} = 1920 \times 1080 \times 60 \times 4 \approx 500 MB/s$$

of bandwidth.

An NTSC source at 60 Hz (interlaced) requires

$$BW_{NTSC} = 720 \times 480 \times 30 \times 2 \approx 21 MB/s$$

of bandwidth.

Note that in some cases it may be possible to capture analog RGB or DVI sources and transfer them internally using a 16-bit YUV format. Doing so will reduce the amount of system bandwidth required to transfer the input data, but it will also degrade the capture quality (since less data is being used to represent each pixel). This option should be used only when necessary, and with sources, when the quality of input capture can be sacrificed.

Regardless of the resolutions and formats of the various inputs, the available system bandwidth shouldn't be exceeded. Doing so will result in reduced system performance and/or instability.

PCI Express architecture overview

To understand how system architecture plays a role in the available bandwidth, a basic understanding of the PCI Express architecture is helpful. This section provides a brief description of the PCI Express architecture to provide enough background to understand the bandwidth calculations provided later in this discussion.

PCI Express is a point-to-point serial transmission interface using high-speed differential signaling to enable high-performance transfer of data within systems. The PCIe architecture is now in its third generation, with each generation providing increased performance over its predecessor. The initial PCIe specification defined a 2.5 Gb/s data transfer rate per lane, while second generation PCIe increased the data rate to 5 Gb/s. The third generation of PCI Express (which is just becoming available in systems at the time of this writing) has further increased the data transfer rate to 8 Gb/s per lane of data. The table below summarizes the data transfer capabilities of the PCI Express architecture based on generation and link width (the link width is the ***size*** of the electrical connection between two PCI Express devices).

The PCI Express specification also defines backward-compatibility between PCI Express devices. That is, a device designed for Gen-3 PCI Express functions at Gen-2 speeds when connected to a Gen-2 device, a Gen-2 device functions at Gen-1 speeds when connected to a Gen-1 device, and so on.

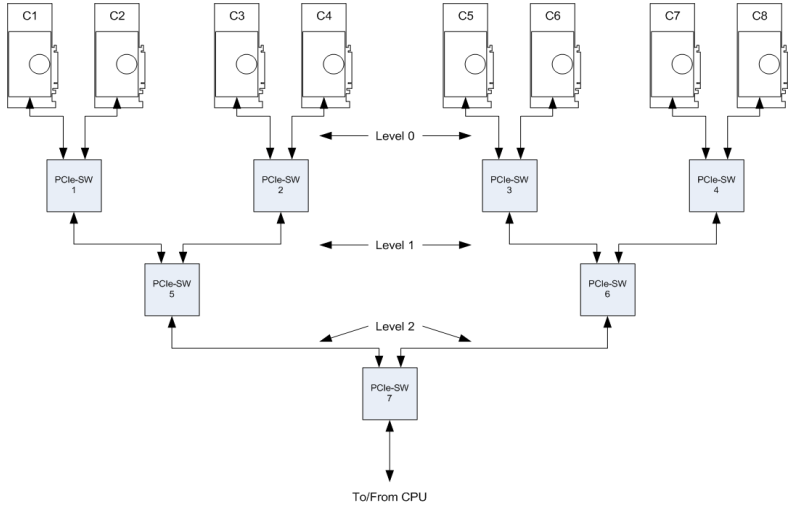
Link width*	PCIe Gen-1	PCIe Gen-2	PCIe Gen-3†‡
×1	250 MB/s	500 MB/s	1 GB/s
×4	1 GB/s	2 GB/s	4 GB/s
×8	2 GB/s	4 GB/s	8 GB/s
×16	4 GB/s	8 GB/s	16 GB/s

* The link width provides a measure of the data transfer capabilities of the link in a single direction. Since each PCI Express lane contains both an upstream and a downstream link, the effective bandwidth is doubled. The numbers in this table represent the maximum bandwidth available in each direction.

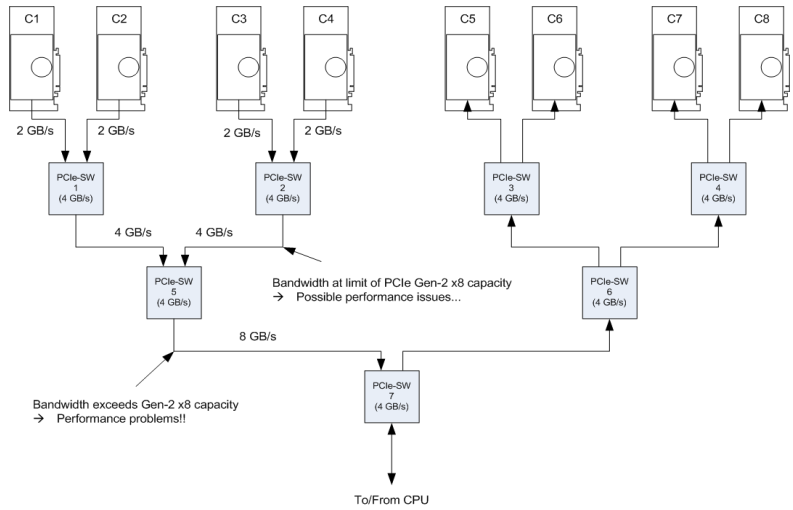
† While the serial data rate has only increased from 5 Gb/s to 8 Gb/s over second generation PCI Express, the encoding of the serial data has changed, providing more efficient transfers and effectively doubling the data transmission rate over Gen-2 PCI Express.

‡ Gen-3 PCI Express is currently in the introductory phase and isn't yet available to end-users.

To maximize data transfer capabilities within a system, having the largest lane widths possible throughout the system is preferred. An ideal system for display wall applications provides PCIe ×16 links for all add-in cards, maximizing throughput at each communication link.

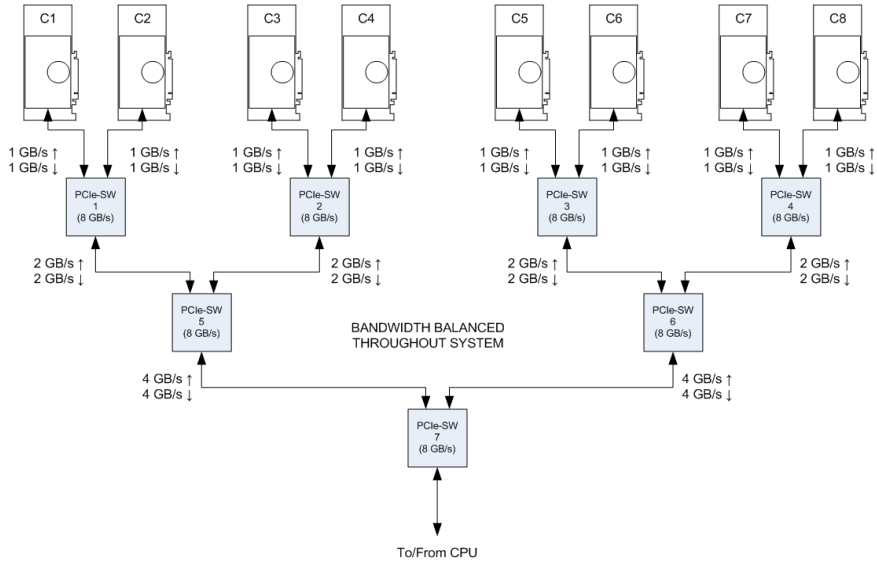


In the diagram above, assume that each PCI Express link is a ×8 connection operating at Gen-2 speeds. Each link thus has a total available throughput of 4 GB/s in each direction. Any combination of input streams being transferred through a given switch that results in the total bandwidth exceeding 4 GB/s will result in reduced system performance (stuttering playback and reduced frame rates). Consider the following example:



Each GPU transmits two HD streams to a Mura card located at the other "end" of the system (C4-C7). This results in a total bandwidth of approximately 2 GB/s per card (2 GPUs per card, each transmitting two HD stream at approximately 500 MB/s per stream) that has to be transferred through the PCIe fabric. The combined bandwidth of the first two Mura cards connected to the first-level PCIe switches (C1 and C2 → PCIw-SW #1) is 4 GB/s, which is at the very limit of the link's capability (while the burst capability of the link is indeed 4 GB/s, there's a link overhead that must be accounted for. This will reduce the effective limit of data that can be transferred. The amount of the reduction is dependent on the PCIe switch architecture, and may be as high as 25-35%). We can already expect bandwidth-related artifacts on the outputs. If we go a level deeper (PCIe-SW #5), the combined bandwidth of the first four Mura cards is almost 8 GB/s, greater than the capacity of the PCIe switches to handle (these are ×8 links).

Now consider the following scenario:



This configuration is an example of how inputs and outputs should be placed whenever possible. In this case, each card is transferring the equivalent of two HD streams to the other "side" of the system, but because the bandwidth at each link remains below the capacity of the switches, there's no problem and the system will function properly.

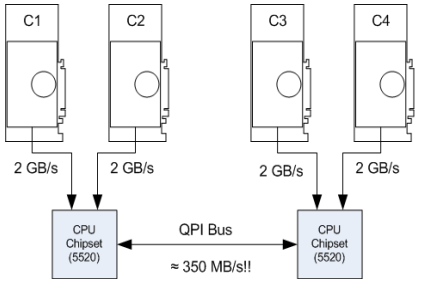
General bandwidth guidelines

Specific guidelines for the installation of the Mura cards in a PCIe-based system can't be provided, as there are many possible motherboards and each client's display wall implementation is custom. Knowledge of the system architecture and the number and types of inputs is required to optimally

place capture cards in the system. By carefully calculating the required bandwidth and ensuring that there are no data bottlenecks in the system, the integrator can guarantee the optimal functioning of the Mura-MPX based display wall.

A word about system architectures

We've assumed up this point that systems used for Mura-MPX based display walls will be based on a switched architecture (that is, the PCI Express connectors are connected to PCI Express switches that form the backbone of the system architecture) for the purpose of providing multiple PCIe slots for add-in cards. There are, however, system motherboards that provide a small number of slots that don't use a switch-based architecture, but rather use the QPI interface between CPU chipsets to ***bridge*** the gap between groups of PCIe slots (see diagram below). Systems based on this architecture don't perform as well as display wall platforms. The QPI interface itself has limited bandwidth that makes it unsuitable for transferring large amounts data (as is the case for a display wall system). At best, the system could be suitable for applications requiring very limited streaming of SD only inputs, or a single graphics-type input at a resolution requiring less than the available QPI bandwidth (system dependent).



When using Intel 5520 chipset, the bandwidth available for transfers between PCIe slots on different chipsets is extremely limited. This chipset does not provide an optimal architecture for Display Wall-type applications, though it *may* be acceptable if required transfers are *very limited*.

Examples:
- SD streams only
- Single graphics-resolution stream (1024x768, 1280x1024)

Appendix

Approved fans for iStarUSA® chassis

Notes

List of approved fan vendors:

- Sunon: PMD1212PTB3-A (2).GN
- Yen-Sun: FD121225EB
- Delta: AFB1212HHE-C
- Adda: AG12012XB257100
- NMB: 4715KL-04W-B40

To assemble the fan connectors to the lead wires on the fan, the following parts are needed:

- Molex 15-24-4048 (Crimp housings)
- Molex 02-08-1201 (Female crimp connectors)

Depending on the voltage rating of the fan, the pin placement is the following:

- Pin 1: +12V
- Pin 2: GND (usually the black lead from the fan)
- Pin 3: GND (only one of the two GND pins needs be connected)
- Pin 4: +5V (leave unconnected if connecting a 12V fan)

Warning: The fan may not work properly or may be damaged if the pins aren't properly connected.

Contact us

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You can get technical assistance by contacting Matrox technical support at dwcsupport@matrox.com.

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